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## Interagency Aviation Training

# A-100 BASIC AVIATION SAFETY



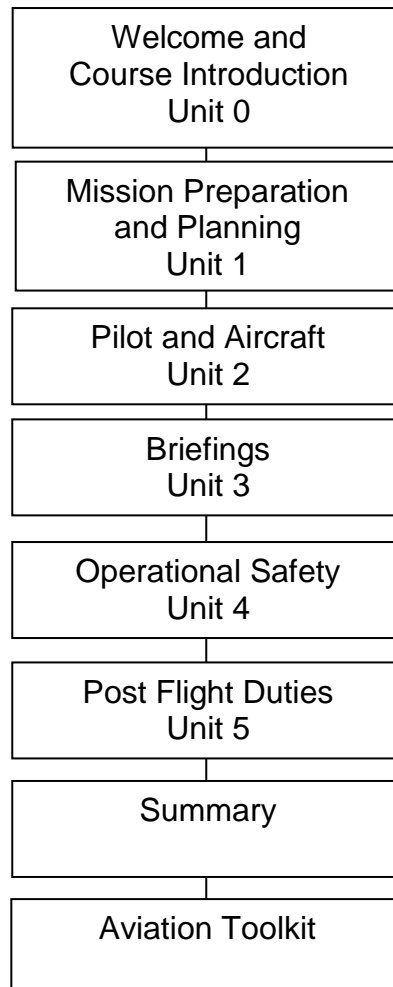
## Participant Workbook

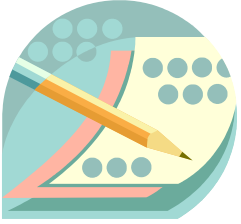


Prepared by Office of Aviation Services Training Division  
and Interagency Aviation Training Partners  
Revised 06/12/2013

# A-100

## Basic Aviation Safety





## Get to Know Your Classmates

Be prepared to share:

- *Name*
- *Where do you work?*
- *How do you use aviation in your current position?*
- *What types of aviation missions have you been involved in?*
- *What do you hope to gain from participating in this course?*

## Overall Course Objective

Provide the aviation user with a foundation of knowledge, skills and abilities to safely utilize aircraft to accomplish agency missions.

## Course Unit Objectives

1. Identify the requirements for pre-mission planning.
2. Identify approved methods of aircraft procurement
3. Identify the 4 principles of risk management
4. Given a scenario apply a risk management process
5. Identify the purpose of a mishap response plan and when it's required
6. determine if a specified mission can be conducted, given a pilot and aircraft data card
7. Identify items to look for on pilot and aircraft cards
8. Differentiate between a mission briefing and an aircraft briefing
9. Describe four elements of an effective mission briefing
10. Identify the required items to be covered in an aircraft crew and passenger briefing
11. Summarize how to properly refuse risk, given a scenario
12. Define crew resource management
13. List items to consider during an in-flight emergency
14. List actions to take if you are first on-scene of an aircraft mishap
15. List survival considerations if involved in an accident in a remote location
16. List 4 "Watch Out" aviation situations given a scenario
17. Identify the appropriate corrective actions given an unsafe scenario
18. Identify 3 situations that would justify a SAFECOM and describe how to submit.
19. List 4 questions to ask during a post-flight debrief /AAR  
List 3 actions to be completed at the end of any flight.

## Mission Preparation and Planning

Notes

Objectives –

After completing this module, participants should be able to:

1. Identify the requirements for pre-mission planning
2. Identify approved methods of aircraft procurement
3. Identify the 4 principles of risk management
4. Given a scenario apply a risk management process
5. Identify the purpose of a mishap response plan and when it's required

### 5 Steps to a safe flight



This card contains the basic elements required to be covered in order to ensure a safe flight. It should be referred to prior to flights and used as a memory jogger to make sure that something isn't missed. Many mishaps we have had in the past could've been prevented if someone had recognized and stopped the chain of events that lead to the accident. Everyone involved in aviation, regardless of experience level, have an obligation to stop unsafe actions/situations when they recognize they are happening.

## Mission Preparation and Planning

Notes

### Twelve Standard Aviation Questions That Shout “Watch Out!”

As part of risk management, especially during high activity fires, each aviation manager and employee should be asking questions.

- Is the flight necessary?
- Who is in charge?
- Are hazards identified and known?

Flight Hazards: Have they been identified and assessed? Have the pilots been informed?

- Should the operation or the flight be stopped due to a change in conditions? Consider the following:
  - Radio Communications
  - Environmental Conditions – weather, visibility, terrain, elevation, temperatures
  - Mission Priorities
  - Successful Mission Completion Probabilities
- Is there a better way to do it?
- Is there pressure to complete a mission at all costs?
- Can you justify your actions?
- Is the mission airspace confined or congested?
  - Multiple aircraft
  - Mixed types of aircraft
  - Poor visibility
- Do you have an escape route?
- Are any guidelines being ignored or policies being broken?
- Are communications getting tense?
- Are you deviating from the assigned operation or flight?

Consider using the aviation operations checklist provided to you.

Research has proven that using a simple checklist can dramatically improve safety. **Full size version is in appendix C.**

Aviation Operations Checklist	
United States Department of the Interior Office of Aviation Services	
<b>IF YOU ANSWER NO TO ANY OF THE FOLLOWING, STOP &amp; REEVALUATE</b>	
<b>Pre-Operation Planning</b>	
Project Aviation Manager and Flight or Helicopter Manager	
<input type="checkbox"/> Yes	Approved/Signed/Current Aviation Management Plan?
<input type="checkbox"/> Yes	Approved/Signed/Current Project Aviation Safety Plan (PASP)?
<input type="checkbox"/> Yes	Operational Risk Assessment completed?
<input type="checkbox"/> Yes	Flight hazard map reviewed and flight hazards identified?
<input type="checkbox"/> Yes	Approved/Signed/Current Mishap Response Plan?
Management Approval:	
<input type="checkbox"/> Yes	Acceptable risk?
<input type="checkbox"/> Yes	Pilot/crewmembers in compliance with training requirements?
<input type="checkbox"/> Yes	Aviation Life Support Equipment (ALSE)?
<b>IF YOU SEE SOMETHING SAY SOMETHING</b>	
<b>Operation Briefing and Preflight Plan</b>	
Flight or Helicopter Manager and Pilot/Flight Crew	
<input type="checkbox"/> Confirm	all personnel have introduced themselves by name, qualification and role.
<input type="checkbox"/> Confirm	mission objectives, strategies and tactics clear.
Is the Weather Forecast Within Limits:	
<input type="checkbox"/> Yes	Winds?
<input type="checkbox"/> Yes	Visibility within minimum?
<input type="checkbox"/> No	long conditions possible? <input type="checkbox"/> Mitigations and equipment planned.
Essential Considerations to Manager:	
<input type="checkbox"/> Yes	Aircraft/Pilot approved for each special use mission and current?
<input type="checkbox"/> Yes	Pilot and crew flight time/duty day requirements within limits?
<input type="checkbox"/> Yes	Pilot briefed on mission and inherent hazards?
<input type="checkbox"/> Yes	Performance Planning Complete?
<b>Operation Briefing and Preflight Plan (continued)</b>	
Essential Considerations To Pilot:	
<input type="checkbox"/> Yes	Preflight responsibilities fulfilled?
<input type="checkbox"/> Yes	Flight following procedures established?
<input type="checkbox"/> Yes	Load calculation/weight and balance calculation completed?
<input type="checkbox"/> Yes	Frequencies obtained?
<input type="checkbox"/> Yes	Flight plan filed?
<input type="checkbox"/> Yes	Pilot expectations communicated?
All Personnel Review Including Pilot:	
<input type="checkbox"/> Yes	Project Aviation Safety Plan (PASP)?
<input type="checkbox"/> Yes	Flight Hazard Map?
<input type="checkbox"/> Yes	Operational Risk Assessment?
<input type="checkbox"/> Yes	Mishap Response Plan?
Passengers and Cargo:	
<input type="checkbox"/> Yes	hazardous materials properly planned for? <input type="checkbox"/> Q/N/A
<input type="checkbox"/> Yes	safety briefing conducted for all passengers?
<input type="checkbox"/> Yes	Passenger and cargo manifest completed?
<input type="checkbox"/> Confirm	all users aware that anyone involved may terminate a flight if an unsafe condition is perceived to exist.
<b>IF YOU SEE SOMETHING SAY SOMETHING</b>	
<b>During Operation</b>	
All Personnel	
Essential In-Flight Discipline For All Personnel:	
<input type="checkbox"/> Yes	All personnel have been allowed to express any mission apprehensions, and these concerns have been addressed?
<input type="checkbox"/> Yes	Flight following procedures being conducted?
<input type="checkbox"/> Yes	PPE and ALSE being utilized and available?
<input type="checkbox"/> Yes	Flight hazard map being utilized?
<input type="checkbox"/> Yes	High reconnaissance flight to identify wires/obstacles that are on the flight hazard map. <input type="checkbox"/> N/A
<b>IF YOU ANSWER NO TO ANY OF THE ABOVE, STOP &amp; REEVALUATE</b>	

## **Mission Preparation and Planning**

*Notes*

### **Aviation Policy**

DOI and USFS aviation policies are a reflection of past mishaps. Policy is written over time based on lessons learned.

#### **Federal Aviation Regulations**

- 14 CFR Part 91
- 14 CFR Part 135
- Etc...

#### **Departmental Policy / USFS National Policy**

- Departmental Manuals (DMs)
- Operational Procedure Memoranda (OPM's)
- Forest Service Manual (FSM) / Forest Service Handbook (FSH)
- Aviation Life Support Equipment (ALSE) Handbook
- And more...

#### **Bureau Policy (DOI) / Regional Policy (USFS)**

- NPS – RM-60
- USGS – SM 445
- FWS – Parts 330-339
- BIA – BIAM 59
- BOR – 114S-37
- BOEMRE – MMS Manual Part 485.5
- OSM – ADS14
- USFS – Regional Aviation Management Plan

#### **Local Unit Policy**

- Regional/State Aviation Plans
- Unit Aviation Plans
- Local Standard Operating Procedures (SOP's)

There is a LOT of policy pertaining to aviation operations. One great resource for finding answers is the [Aviation Technical Assistance Directory](#). It contains contact information for aviation experts in the USFS and most (but not all) the bureaus in DOI.

## **Mission Preparation and Planning**

*Notes*



**If you don't know, ask!**

### **Mishap Prevention Plan**

All agencies should have a formal written mishap prevention plan. Often referred to as an "aviation plan".

### **Types of Missions**

Aviation missions are broken down by two basic types.

- 1. Point-to-point**
  
- 2. Special-Use or Mission Use**

### **Mission Planning**

When planning a mission there are many things that must be considered prior to conducting a mission.

**Mission Preparation and Planning***Notes***1. What's the Right Tool?****Airplanes-  
Pros****Cons****Helicopters  
Pros****Cons****2. Flight Routes/Areas and altitudes****3. Risk Assessment****4. Flight Hazard Maps**

To reduce wire strike potential, a low level flight hazard map **shall** be constructed for the local operational area. All preplanned low level flights require a thorough map reconnaissance of the route to be flown.

**5. Objectives****6. Cost****7. Justification****8. Approval**



## **Mission Preparation and Planning**

*Notes*

### **Project Aviation Safety Plans**

In order to ensure the items we just discussed are covered it is imperative to use an organized approach to planning a mission. A great way to do this is by using a Project Aviation Safety Plan (PASP). The PASP should cover all of the required pre-flight planning elements. It also provides a format by which to document your planning process.

#### **1. Types of PASP's**

There are several types of project plans. Some agencies require a specific template, some do not. What's important is that a plan is completed for every flight. Make sure to allow enough time in advance of the mission to complete the plan.

#### **2. Common Elements of PASP's**

#### **3. Who completes the PASP?**

#### **4. Who approves the PASP?**

## **Personal Protective Equipment**

As missions are planned, there are different PPE requirements depending on the mission and the type of aircraft.

The Aviation Life Support Handbook outlines the minimum requirement for PPE. Users should refer to it prior to flight to ensure they are utilizing the proper PPE.

Supervisors are responsible for evaluating aviation activities and providing employees with appropriate ALSE equipment. Supervisors are also required to provide employee training on the proper use of ALSE equipment. Individuals are encouraged to supplement these requirements to better meet the needs of the mission and environment.

### **Minimum PPE Requirement**

Flight crewmembers and aircrew members engaged in special use activities, except airplane operations above 500 feet AGL, such as fire recon, resource recon, air tactical use, etc., are required to wear the following ALSE unless specifically exempted

- Flight helmet
- Fire-resistant clothing
- All-leather, or leather and NOMEX gloves
- Leather or approved non-leather boots

#### **1. Flight Helmets**

If you plan to doing both airplane and helicopter missions, make sure the helmet you purchase can be used for both aircraft. Refer to ALSE handbook for details.

Helmets provide both hearing and eye protection when used appropriately.

#### **2. Fire-Resistant Clothing**

Preferred material is commonly referred to as NOMEX. There are some other types of material that are acceptable. Details can be found in the ALSE Handbook

#### **3. Secondary Restraints**

In some cases a secondary restraint system is required when operating an aircraft with the doors off. Refer to the ALSE handbook for specifics.

#### **4. Anti-Exposure Suits**

An anti-exposure garment must be worn in single engine aircraft and readily available to occupants of multiengine aircraft when conducting extended overwater flights and when the water temperature is colder than 50°F.

#### **5. Personal Flotation Devices**

An inflatable PFD must be worn by all occupants in single engine aircraft and made immediately available to all occupants in multiengine aircraft that are operating off of or to water, or that operate beyond gliding distance from shore including water bucket dipping and snorkeling operations.

**The PFD must be USCG approved and not be water activated.**

**Flight Following**

An agency flight plan may be used in lieu of a FAA flight plan. Agency Flight Following is done primarily for those flights taking place within a local geographic area.

**Are you prepared to survive?**

During mission preparation and planning it is important to consider the worst case scenario that the mission is not successful and the aircraft crashes. Proper PPE, Restraints, and Flight Planning will increase your chances of surviving the initial crash. However, it is just as important to be prepared for surviving the post-crash conditions that you might face following an accident.

**INTERACTION**

**Essex, MT Mishap**—This interaction will establish a case study that can be discussed in relation to survival preparedness.



The survivors reported that all their gear, including foul-weather clothing, food, sleeping bags and a satellite telephone, remained in the airplane and was destroyed in the fire. After getting out of the airplane, they had only the clothes they were wearing for the flight. The female survivor reported that she was wearing “hiking boots, a pair of black Carhartts, a capilene T-shirt and a hooded sweatshirt.” Her clothes were not significantly fire damaged. She had burns on her hands and a back injury. The male survivor reported that he was wearing two thin polypropylene shirts, wool pants and hiking boots. His shirts and pants were completely burned away in the front. He had burns on his face, hands and chest and a back injury. According to the female survivor, the front passenger was wearing an undershirt, a button-down shirt and a Nomex jacket, jeans and hiking boots. His jeans were burned away from the thigh down, but the Nomex jacket was undamaged. He had a broken leg and burn injuries to his face, hands and legs.

The right front seat passenger succumbed to his injuries the morning after the accident. At that time, the two survivors decided to depart the site for lower elevation due to extreme cold and precipitation.

Full Narrative is available in Appendix A

## **Survival Considerations**

- Shelter
- Weather
- Warmth/Cool
- Signaling
- Water
- Fire
- Communication
- Ditching

## **Personal Survival Kit**

At a minimum each person should carry, on their person, the following, to maximize their chances of survival.

- Fire starter (can be two boxes of matches in waterproof containers, “metal match” etc.)
- Laser rescue light or key chain LED light
- Signal mirror
- Whistle
- Knife or tool containing a knife blade
- Water purification tablets
- Sealing clear plastic bag(s)
- Personal locator beacon (PLB)
- Radio (If issued one)
- Cell phone

## **Once you have a plan, you need and aircraft.**

There are several different methods to procure an aircraft. All procured aircraft must be done through DOI or USFS contracts. Examples of different types of contracts are:

- 1. Exclusive-Use**
- 2. Call When Needed or On Call Contracts**
- 3. Aircraft Rental Agreement**
- 4. End-Product Contract**

If you are not sure what method to use, contact your aviation manger. Aviation Technical Assistance Directory is a good source of information for contacting the right specialist.

## **Cooperator Aircraft**

USFS and DOI personnel routinely work with cooperator aircraft  
Some examples of cooperator aircraft are:

- State
- Military
- Other fed agencies
- Academic institutions
- Utilities
- Foreign government

## **Fleet Aircraft**

Aircraft that are owned by the Bureau / Agency they operate for. In some situations these aircraft are also privately owned by an employee with the Bureau / Agency. These aircraft must follow the guidelines established through Agency manuals

## **Fundamentals of Risk Management**

- 1. Accept no unnecessary risk**
- 2. Make risk decisions at the appropriate level**
- 3. Only accept risk when benefit outweigh cost**
- 4. Integrate risk management throughout the mission from start to finish**

## **Risk Management Process**

- 1. Identify Hazards**
  - Source of danger
- 2. Assess Hazards**
  - Quantitative determination or qualitative value of risk
- 3. Develop controls and make decisions.**
  - Determine what measures will mitigate the risk

- Decide if the risk is acceptable once controls are in place.

#### **4. Implement your controls**

- PPE
- Procedure
- Delay

#### **5. Supervise and Evaluate**

- Determine if the controls are working or if anything has changed that would require the plan to change.
- If there are changes then the process would start anew.

### **Methods of Assessing Risk**

There are many different tools available to assess risk in an organized manner.

Some examples include:

- Risk Matrix
- GAR Model
- USFS/BLM Risk Management Handbook
- FAA risk assessment

### **“Rescue Gone Wrong”**

Take a few minutes and watch the following video. During the video write down any potential hazards that could be associated with this mission. At the conclusion of the video, we will complete one of the risk assessment worksheets (appendix B) and quantify the level of risk.



Be prepared to share some of your findings with your classmates.

## **Mishap Response Plans**

Even with proper planning mishaps can still occur. It is a requirement that agencies develop a written mishap response plan. The Mishap Response Plan serves several purposes and should include the following:

- Must be specific to the flight/location
- Expedite SAR in the event of a mishap
- Planning tool
- Must be validated annually
- Should be kept with
  - i. Dispatch
  - ii. Flight follower
  - iii. At your base of operations
  - iv. You should keep a copy

### **Mishap Response Priorities.**

#### **1. Protect Life**

- Extraction from remote areas
- Location of local hospitals and contact information

#### **2. Protect Property**

#### **3. Preserve Evidence**

#### **4. Notify and Investigate**

**Unit 2: Pilot and Aircraft****Notes****Objectives –**

After completing this module, participants should be able to:

1. determine if a specified mission can be conducted, given a pilot and aircraft data card
2. Identify items to look for on pilot and aircraft cards

**Carding**

- Pilot Qualification Card
- Aircraft Data Card
- Mechanic Qualification Card
- Service Vehicle Data Card

**Pilot Qualification Cards**

- Name on card is the person presenting it
- Company on card is same as company providing service
- Pilot is authorized for same make and model of aircraft being flown
- Pilot is carded for the missions you are requesting
- No expiration has been exceeded, either on front of card or beside specific mission being flown.

**There are two types of Pilot Qualification Cards**

- Helicopter
- Fixed Wing

**Aircraft Data Card**

- Point-to-Point Card (DOI or USFS Specific)
- Interagency Helicopter Card
- Interagency Airplane Card

Each aircraft card will contain the following information

- Expiration date
- The N number of the aircraft the card is issued to
- The specific missions the aircraft is carded for
- The company the aircraft is carded under
- The contract number under which the aircraft was initially carded



**Unit 2: Pilot and Aircraft****Notes****Inspection and Carding Exercise...**

Given the following cards by a pilot that has just arrived to perform a mission on an On-call contract, answer the following questions

Take 5 minutes to answer the questions below using the example cards provided. Then be prepared to discuss results with the group.

 <p><b>USDA / USDI HELICOPTER PILOT QUALIFICATION CARD</b></p> <p>Pilot Name: <u>Smith, James</u> <small>(Last, First, MI)</small></p> <p>Company: <u>Acme Helicopters, Inc.</u></p> <p>Authorized Aircraft: <u>BH407, AS350B3, BH212</u></p> <p>CUS-308 (10/12) 5700-3A</p> <p>Expiration Date: <u>10/31/2013</u></p>	<p><b>CARD STATUS</b></p> <p>Interagency(✓)    DOI Only( )    USFS Only( )</p> <p>Initial( )    Renewal(✓)    Re-Issue( )    Added Skill( )</p> <p>Inspector Comments: _____</p> <hr/> <p>Issued By: <u>Miller</u>    <u>OAS-HQ</u> <small>(Printed Last Name)    (Agency &amp; Home Unit ID)</small></p> <p><u>arlyn_miller@nbc.gov</u>    <small>Digitally signed by arlyn_miller@nbc.gov DN: cn=arlyn_miller@nbc.gov, email=2012.11.02.133551.6666</small></p> <p><small>(Inspector's Signature)</small> <b>Issue Date</b>    <u>10/09/2012</u></p>
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12. Mr. James Smith arrives at your airport flying in a black helicopter that has the company name in bright red letters on the side "ACME Helicopters". It is September 1, 2013 and the Bell 206L4 helicopter has all the necessary equipment to conduct your mission. After asking to see the pilot's card, do you see any problems with continuing the mission?

2. Is James approved to fly USFS missions?

**Unit 2: Pilot and Aircraft****Notes**

13. The mission you have planned will require that James "belly hook" several external loads. Is he carded to fly this mission profile?

14. If this mission required landing on the water in fixed floats, would this pilot be able to fly the mission?

Explain –

Pilot Name (Last, F+ Initials)	Smith, J.	Date Expires	Flight Evaluation Completed <small>For Inspector Use Only</small>			
			Initials	DOI	USFS	Make/Model Evaluated
Approved	Mission					
AEM	Low Level (Recon & Surv.)				X	
AEM	Helitack/Passenger Transport				X	
AEM	External Load (belly hook)				X	
AEM	Water/Retardant Delivery	10/2015	AEM	X		BH407
AEM	Longline VTR (150')	10/2015	AEM	X		BH407
.....	Snorkel VTR <input type="checkbox"/> Mirror <input type="checkbox"/>					
AEM	Mountainous Terrain Flight				X	
AEM	Aerial Ignition: PSD				X	
AEM	Aerial Ignition: Torch				X	
.....	Rappel Operations					
AEM	Cargo Letdown	05/2014		X		
	Snow Operations (deep snow)					

.....	Designated "Pilot Trainer"					
.....	"Trainee Only" Pilot					
.....	Short Haul LE <input type="checkbox"/> SAR <input type="checkbox"/>					
AEM	Float Operations (fixed)	03/2013		X		AS350B2
.....	Platform Landings: Offshore					
AEM	Vessel Landings	04/2014		X		EC135
.....	Night Vision Goggle Operations					
.....	ACETA Net Gun (all ACETA)					
AEM	ACETA Eradication	07/2015	AEM	X		AS350B3
.....	ACETA Gathering/Capture (Herd)					
.....	ACETA Darting/Paintball					
.....	STEP					
.....	Hoist					

## Unit 3: Briefings

## Notes

*“Before any flight it is essential that you brief the pilot about the mission. Also, that you receive an aircraft briefing from the pilot before climbing on board...”*

### Objectives –

After completing this module, participants should be able to:

1. Differentiate between a mission briefing and an aircraft briefing
2. Describe four elements of an effective mission briefing
3. Identify the required items to be covered in an aircraft crew and passenger briefing
4. Summarize how to properly refuse risk, given a scenario

## **Briefings**

There are two essential briefings that must take place prior to any flight. A pilot cannot effectively fly a mission and exercise risk management without knowing the details of the flight. This is where a Mission Briefing becomes essential. You and those who will be flying must also have information that is required by the FAA and plays a part in you being safe during flight activities. This is where an Aircraft Briefing is required.

### **1. Mission Briefings**

- Mission objectives
- Hazards
- Routes
- Communication
- Flight following
- Emergency Procedures
- Roles/Responsibilities
- Weight/Balance (manifesting)
- Weather
- PPE
- Mishap Response Plan
- Airspace
- Risk assessment

## Unit 3: Briefings

Notes

- Sunrise/Sunset
- Personnel trained, qualified and current for the mission
- Fueling
- HAZMAT
- Cargo loading/unloading
- Any other items essential to the mission.

### **2. Aircraft Briefing**

- Smoking
- Use of Safety Belts
- Placement of seat backs
- Operation of doors
- Emergency exits
- Survival equipment – location
- Fire extinguisher – location & operation
- Ditching procedures & PFD – if overwater flight
- Use of Oxygen – if flight above 12,000 feet MSL
- Emergency Locator Transmitter – location & operation (DOI/USFS requirement)
- Aviation Life Support Equipment – proper use (DOI/USFS requirement)
- 1<sup>st</sup> aid equipment – location (DOI/USFS requirement)

Some additional items that would be good to brief on prior to each flight include:

- Aircraft hazards
- How to use the intercom/radio system
- Gear and cargo security – not under **seats**
- Fuel & oxygen shut-offs
- Battery shut off

## Unit 3: Briefings

## Notes

### **Helicopter Safety Briefing**

- Wait for the Pilot to Indicate it is Safe to Approach
- Approach & Depart in View of the Pilot
- Carry Tools Parallel to the Ground
- Always Approach From Downhill
- Helicopters may be loaded and unloaded with the engine(s) running, as long as a qualified aircrew member attends to the loading/unloading.
- Pilot must remain at controls

Always secure loose items

[Link to Mishap listed in slide](#)

### **Airplane Safety**

- Stay clear of propeller at all times
- Stay in pilot field of view
- Both DOI and Forest Service policy require that single engine aircraft be shut down prior to loading and unloading passengers.
  - Forest Service requires both engines be shut down for loading and unloading

#### Multi-Engine Airplanes

- DOI will allow for engine(s) to remain running as long as certain conditions are met 351DM1

#### Floatplane Safety

- Do not attempt to “catch” the plane
- Step on the float only at pilot’s direction
- Stay aft of the wing strut
- PFD’s are required for take-off/landings!

### **Key requirements of every briefing**

1. Door Operation
2. Seatbelts
3. Emergency Locator Transmitter
4. First Aid & Survival Kits
5. Cargo
6. Fire Extinguisher
7. Fuel & Battery Shut-Off
8. Oxygen
9. Emergency Exits

## Unit 3: Briefings

## Notes

- 10. Crash Positions
- 11. Smoking
- 12. Visibility & VFR Flight Rules
- 13. Fueling

### **Refusing Risk**

Every individual (government and contract) has the right and obligation to report safety problems affecting his or her safety and has the right to contribute ideas to correct the hazard. In return, supervisors are expected to give these concerns and ideas serious consideration. Individuals may turn down an assignment when:

- 1. There is a violation of regulated safe aviation practices.
- 2. Environmental conditions make the work unsafe.
- 3. They lack the necessary qualifications or expertise.

Individuals will directly inform their supervisor that they are turning down the assignment as given. The most appropriate means of documented turn down criteria is using the Aviation Watch Out Situations.

If the assignment has been turned down previously and the supervisor asks another resource to perform the assignment, he or she is responsible to inform the new resource that the assignment has been turned down and the reasons why. Furthermore, the personnel need to realize that a turn down does not stop the completion of the assigned operation. The turn down protocol is an integral element that improves the effective management of risk, and it provides timely identification of hazards within the chain of command, and raises risk awareness for both supervisors and subordinates and promotes accountability.

If an unresolved safety hazard exists, the individual needs to communicate the issue/event/concern immediately to their supervisor and document as appropriate, including filing an Aviation Safety Communique (SAFECOM).



## Unit 4: Operational Safety

Notes

*“During every flight there are things that need to be considered in order for the flight to be conducted safely...”*

Objectives –

After completing this module, participants should be able to:

12. Define crew resource management
13. List items to consider during an in-flight emergency
14. List actions to take if you are first on-scene of an aircraft mishap
15. List survival considerations if involved in an accident in a remote location
16. List 4 “Watch Out” aviation situations given a scenario
17. Identify the appropriate corrective actions given an unsafe scenario



## Unit 4: Operational Safety

Notes

### Crew Resource Management

Purpose of CRM is to reduce the number of mishaps through better crew coordination.

Several things should be considered when talking about CRM

#### 1. CRM training

Topics that should be included are:

- Briefings
- Safety
- Security
- Self-Critique
- Conflict resolution
- And more..

#### 2. Who do we consider the Crew?

- Pilots
- Aircrew Members
- Aviation Managers
- Dispatchers
- Anyone else who is integral to the mission.

#### 3. Indicators Of Good CRM

- Crew is ahead of the curve
- All are involved in planning
- SOP's/Policy in being followed
- Open Communication
- Thorough briefings
- Everyone knows their roles/responsibilities
- Etc...

#### 4. CRM "Red Flags"

- Deviation from the plan/SOP's
- Use of improper procedures
- Failing to meet planned targets
- Fixation/Preoccupation
- Anger/Frustration
- Distraction
- Inappropriate priorities
- Hazardous actions

## Unit 4: Operational Safety

Notes

All aviation users are encouraged to seek out additional CRM training opportunities. In order to master the skills required to maximize coordination, CRM training needs to be on a recurring basis.

### INTERACTION

#### Rescue Gone Wrong

List some of the CRM red flags you may have identified during the rescue gone wrong video.



How would you address them with the pilot if you were the spotter on the mission?

## Unit 4: Operational Safety

Notes

### In-flight Emergencies

Personnel should be prepared for the event of an in-flight emergency. Some of the actions to take are:

- Pilot Declares the Emergency
- Protective Clothing in Use
  - Collars up, sleeves down
  - Visors down on flight helmet
  - Gloves on
- Seat Restraints Snug
- Keep Away From Controls
- Secure Loose Gear (loose gear can become missiles unless they're secured!)
- Locate Emergency Exits
- Assume the Crash Position

**WAIT FOR ALL MOTION TO STOP BEFORE EXITING** (Do not survive a crash only to be killed by flying debris as you depart the aircraft!)

### Aircraft Mishap Response Actions

Time is extremely critical when responding to an emergency. Immediate positive action is necessary; delay may affect someone's survival.

If you are the person performing the flight following, initiate the mishap response plan. Follow the directions line by line to ensure that everything is covered.

If you are responding to an aviation accident, or if you are a survivor of an aviation accident, here are some things to consider during rescue operations:

- Preserve life.
- Do whatever is necessary to extricate injured occupants and to extinguish fires.
- Secure the area.
- Document and/or photograph the location of any debris that must be disturbed in order to carry out rescue and/or fire suppression activities.
- Identify witnesses and get contact information.

#### Mishap reporting

- Any event with an aircraft that results in damage or injury, no matter how slight.
- An aircraft is overdue and believed to be involved in an accident.
- A runway incursion or near mid-air that requires immediate corrective

## Unit 4: Operational Safety

Notes

action.

- Report immediately to the DOI/USFS aviation mishap reporting hotline – 1 888 464-7427 (888-4MISHAP)

### Site Safety Precautions

Aircraft wreckage sites can be hazardous for many reasons other than adverse terrain or climatic conditions. Personnel involved in the recovery, examination, and documentation of wreckage may be exposed to physical hazards such as hazardous cargo, flammable and toxic fluids, sharp or heavy objects, and disease. It's important to exercise good judgment, use available protective devices and clothing, and use extreme caution when working in the wreckage.

### Survival Considerations in Remote Environments

Stay positive. Odds of survival increase when survivors choose not to lose hope. Survivors need to engage their brains in the survival process.

Consider the priorities for survival:

- Shelter
  - From cold
  - From sun
  - Weather
- Fire
- Water
- Communication
- Signaling

Assume you will only get out of the aircraft with what you are carrying on your body. Ensure your personal survival kit is adequate to survive in the environment you will be flying over.

There are many sources for advance survival training. Individuals should determine if additional training is needed for the environment they operate in.

## Unit 5: Post Flight Duties

## Notes

*“Now that you’re safely back on the ground there are still some things that need to be done...”*

Objectives –

After completing this module, participants should be able to:

1. Identify 3 situations that would justify a SAFECOM and describe how to submit
2. List 4 questions to ask during a post-flight debrief /AAR
3. List 3 actions to be completed at the end of any flight

### Close Flight Plan/ Flight Following

Make sure at the end of the flight that the pilot can close out their flight plan or that flight following has been ended.

Remember that a Flight Plan and Flight Following are a pre-emptive request for Search and Rescue. If the plan is not closed out, SAR may be initiated.

### Post-Flight Debrief

The climate surrounding a debrief must be one in which the participants openly and honestly discuss what transpired, in sufficient detail and clarity, so everyone understands what did and did not occur and why.

Most importantly, participants should leave with a strong desire to improve their proficiency.

- A debrief is performed immediately after the event, when possible, by the personnel involved.
- The leader’s role is to ensure skilled facilitation of debrief.
- Reinforce that respectful disagreement is OK. Keep focused on “what, not who”.
- Make sure everyone participates.
- End debrief on a positive note.

### Discuss the following

1. What was planned?
2. What actually happened?
3. Why did it happen?
4. What can we do next time?  
(Correct weaknesses/sustain strengths)

## Unit 5: Post Flight Duties

## Notes

### Additional Considerations

There are a couple of things that might need to be considered based on the type of procurement and whether the mission is on-going or complete.

#### 1. Invoicing/Payment

- Record all times
- Keep a record of what was accomplished on the flight
- Complete and submit payment information
- Complete and send daily diary to contracting officer

#### 2. **Secure Aircraft**

Pilot is responsible for “dual-locking” and securing the aircraft if it is unattended. There are many types of locking mechanisms for aircraft. Ask the pilot what method they use.

- Throttle lock
- Tail rotor lock
- Battery lock
- Prop lock
- Pedal lock
- Control Lock

## Summary

## Notes

### Summary

1. Proper and thorough pre-flight planning is key in ensuring a safe flight
2. Pilots and aircraft must be approved for mission
3. Briefings/Debriefings must take place
4. Risk management is a constant process
5. Everyone has an obligation to stop unsafe actions
6. Follow the 5-steps card and utilize the aviation operations checklist
7. Review the 12 watch out situations
8. Use the toolkit references

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## APPENDIX A

### Essex Mt – NTSB Report

NTSB Identification: **SEA04GA192.**

Accident occurred Monday, September 20, 2004 in Essex, MT

Aircraft: Cessna U206G, registration: N206SM

Injuries: 3 Fatal, 2 Serious.

The purpose of the public use flight was to transport four United States Forest Service (USFS) employees to a remote back-country airstrip. The flight's departure was delayed 2 hours due to heavy rain showers and a thunderstorm. The planned flight route was to follow a highway through a river valley with high terrain (peaks above 8,000 feet) on both sides until reaching a point where the highway diverged from the river. At that point, the flight was to leave the highway and follow the river. Analysis of available weather data indicated that as the airplane proceeded along the river valley, ridge tops on both sides of the valley became obscured. Bases of the overcast were probably about 7,000 feet msl. Ragged clouds and mist were probably present beneath the overcast due to recent rain showers in the area. Slant visibility was likely diminished. Local pilots reported that in these type weather conditions the numerous drainages that feed into the river valley can be similar in appearance. The pilot made a position call about 15 minutes after takeoff stating that he was over a small town located close to the point where the flight was to leave the highway. This was the last radio communication received from the airplane. Analysis of radar data available for the first 8 minutes of the flight indicated the airplane was not at the position reported by the pilot, but was actually well short of this position. About 15 minutes later, witnesses heard and saw the airplane flying up a drainage located short of the reported position. This drainage ended in a box canyon. Inspection of the accident site indicated that the airplane was in a left climbing turn when it impacted steep terrain near the head of the drainage at an elevation of about 6,600 feet. The airplane nosed over, came to rest inverted, and a fire erupted. Three of the occupants exited the burning wreckage. All communications equipment, survival equipment and foul-weather gear aboard the airplane were destroyed in the fire. One of the three initial survivors died from his injuries the following morning. At that time, the remaining two survivors decided to depart the site for lower elevation due to extreme cold and precipitation. Searchers found the wreckage later that afternoon. The two survivors walked out to the highway 2 days after the accident. No abnormalities were noted during examination of the airplane that would have prevented normal operation. When the pilot took a check ride that allowed him to act as pilot in command of public use flights carrying passengers into the back-country, he reported to the check pilot that he had 100 hours flight time in "typical terrain (over mountains)." USFS standards required 200 hours flight time in typical terrain. However, the standards did not define typical terrain. Examination of the pilot's logbook revealed that it did not include a specific record of back country or mountain flying experience. Review of the past 2 years of logbook entries revealed a total of only 15 entries (14 hours flight time) that included a takeoff or landing at a back-country airport.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

The pilot's misidentification of the airplane's location, which resulted in his improper decision to fly into the wrong drainage, and his failure to maintain terrain clearance while executing a turn to reverse course after he realized his navigational error. Contributing factors were the low visibility due to mist, obscuration of the mountainous terrain, and the pilot's lack of experience in back country flying.

## APPENDIX B

### AVIATION RISK ASSESSMENT WORKSHEET

Assess the risks involved with the proposed operation. Use additional sheets if necessary.

Risk Assessment Matrix			HAZARD PROBABILITY				
			Frequent	Likely	Occasional	Seldom	Unlikely
			A	B	C	D	E
EFFECT	CATASTROPHIC	I	EXTREMELY HIGH(4)				MEDIUM
	CRITICAL	II	HIGH(3)			MEDIUM	
	MODERATE	III	HIGH		MEDIUM(2)		
	NEGLIGIBLE	IV	MEDIUM		LOW(1)		

Assignment:

Date:

Describe Hazard:

**Pre-Mitigation hazards rate out as:**Probability  
(A-E)Effect  
(I-IV)Risk  
Level

Mitigation Controls:

**Post-Mitigation hazards rate out as:**Probability  
(A-E)Effect  
(I-IV)Risk  
Level

Operation Approved By:

Title:

Date:




## GAR Risk Assessment Worksheet

Operation:		Scheduled Date:
Objective(s):		
<b>Supervision</b>	<b>Circle the number as appropriate</b>	
Supervisor has perfect knowledge about the mission, personnel, capabilities and limitations, and is able to apply the appropriate control to minimize risk	<☺ 1 2 3 4 5 6 7 8 9 10 ☹>	Supervisor has little knowledge about the mission, personnel, capabilities and limitations, and lacks skill, knowledge or ability to apply the appropriate control to minimize risk.
<b>Planning</b>		
There is a well designed plan that is reviewed and revised as needed to meet the demands for safety and efficiency and to account for adaptation. Time is well managed.	<☺ 1 2 3 4 5 6 7 8 9 10 ☹>	There is no plan or the plan doesn't address many current adaptations made in response of demands for efficiency. Time constraints have a strong effect on ability to plan.
<b>Contingency Resources</b>		
Reliable alternative equipment and personnel are available, easily accessed and informed about the mission requirements	<☺ 1 2 3 4 5 6 7 8 9 10 ☹>	The outcome depends on the equipment and personnel assigned completing the mission perfectly. Failure is not an option
<b>Communication</b>		
Interpersonal communications are clear and there is a high level of trust in the organization. Adequate personnel and technology are available to relay information accurately to those who make the decisions	<☺ 1 2 3 4 5 6 7 8 9 10 ☹>	There is low trust in the organization or the personnel/communication equipment is unreliable based on the expected needs for the mission.
<b>Team Selection</b>		
Multiple personnel with skill, knowledge and ability are available to fulfill the requirements of the mission. Selection and preparation are done well in advance so there is plenty of time for personnel to get personal and job related demands addressed.	<☺ 1 2 3 4 5 6 7 8 9 10 ☹>	Only one person is available and the success of the mission depends on that person juggling many responsibilities to squeeze this mission into the work schedule. Additional time will be donated to keep up with the workload.

<b>Team Fitness</b>		
Personnel are trained, proficient, healthy, and rested prior to starting the mission. Personal issues are addressed and little external stress is being exerted.	<☺1 2 3 4 5 6 7 8 9 10☹>	Personnel lack one or more critical component in their training. These persons have been squeezing in many additional duties as assigned distracting them from their proficiency or personal life.
<b>Environment</b>		
Weather and visibility are conducive to the best possible chance for success in the mission. Operational tempo is appropriate for the mission	<☺1 2 3 4 5 6 7 8 9 10☹>	Winds are unpredictable, temperature is extreme, low ceilings and visibilities, precipitation, sun angle creates strong shadows, etc. Mission tempo is too low or high.
<b>Mission Complexity</b>		
A single agency is involved with personnel from the same unit who regularly work together. Mission is straight forward and covered by standard operating procedures.	<☺1 2 3 4 5 6 7 8 9 10☹>	Multiple agencies are involved in a mission that defies definition or has ever been attempted. Personnel are new to each other and come from different cultures. Many leaders are emerging and working toward different objectives.
	<b>Mission Total:</b>	
<b>Benefit Statement</b>		
<b>Operation Approved by:</b> <b>Date:</b>	<b>Title:</b>	
<b>GREEN ZONE (1-35)</b>	<b>AMBER ZONE (36-60)</b>	<b>RED ZONE (61-80)</b>


## APPENDIX C

Aviation Operations Checklist		Operation Briefing and Preflight Plan (continued)	
 <b>United States Department of the Interior</b> Aviation Management Directorate		<b>Essential Considerations To Pilot:</b>	
		<input type="checkbox"/> Yes	Preflight responsibilities fulfilled?
		<input type="checkbox"/> Yes	Flight Following procedures established?
		<input type="checkbox"/> Yes	Load calculation/weight and balance calculation completed?
		<input type="checkbox"/> Yes	Frequencies obtained?
		<input type="checkbox"/> Yes	Flight plan filed?
		<input type="checkbox"/> Yes	Pilot expectations communicated?
<b>IF YOU ANSWER NO TO ANY OF THE FOLLOWING, STOP REEVALUATE</b>		<b>All Personnel Review Including Pilot:</b>	
<b>Pre-Operation Planning</b>		<input type="checkbox"/> Yes	Project Aviation Safety Plan (PASP)?
Project Aviation Manager and Flight or Helicopter Manager		<input type="checkbox"/> Yes	Flight Hazard Map?
<input type="checkbox"/> Yes	Approved/Signed/Current Aviation Management Plan?	<input type="checkbox"/> Yes	Operational Risk Assessment?
<input type="checkbox"/> Yes	Approved/Signed/Current Project Aviation Safety Plan (PASP)?	<input type="checkbox"/> Yes	Mishap Response Plan?
<input type="checkbox"/> Yes	Operational Risk Assessment completed?	<b>Passengers and Cargo:</b>	
<input type="checkbox"/> Yes	Flight hazard map reviewed and flight hazards identified?	<input type="checkbox"/> Yes	Hazardous materials properly planned for? <input type="checkbox"/> N/A
<input type="checkbox"/> Yes	Approved/Signed/Current Mishap Response Plan?	<input type="checkbox"/> Yes	Safety briefing conducted for all passengers?
<b>Management Approval:</b>		<input type="checkbox"/> Yes	Passenger and cargo manifest completed?
<input type="checkbox"/> Yes	Acceptable risk?	<input type="checkbox"/> Confirm all users aware that anyone involved may terminate a flight if an unsafe condition is perceived to exist.	
<input type="checkbox"/> Yes	Pilot/crewmembers in compliance with training requirements?		
<input type="checkbox"/> Yes	Aviation Life Support Equipment (ALSE)?		
<b>IF YOU SEE SOMETHING SAY SOMETHING</b>		<b>IF YOU SEE SOMETHING SAY SOMETHING</b>	
<b>Operation Briefing and Preflight Plan</b>		<b>During Operation</b>	
Flight or Helicopter Manager and Pilot/Flight Crew		<b>All Personnel</b>	
<input type="checkbox"/> Confirm all personnel have introduced themselves by name, qualification and role.		<b>Essential In-Flight Discipline For All Personnel:</b>	
<input type="checkbox"/> Confirm mission objectives, strategies and tactics clear.		<input type="checkbox"/> Yes	All personnel have been allowed to express any mission apprehensions and these concerns have been addressed?
Is the Weather Forecast Within Limits:		<input type="checkbox"/> Yes	Flight Following procedures being conducted?
<input type="checkbox"/> Yes	Winds?	<input type="checkbox"/> Yes	PPE and ALSE being utilized and available?
<input type="checkbox"/> Yes	Visibility within minimums?	<input type="checkbox"/> Yes	Flight hazard map being utilized?
<input type="checkbox"/> No	Icing conditions possible? <input type="checkbox"/> Mitigations and equipment planned.	<input type="checkbox"/> Yes	High reconnaissance flight to identify wires/obstacles that are on the flight hazard map. <input type="checkbox"/> N/A
<b>Essential Considerations to Manager:</b>		<b>IF YOU ANSWER NO TO ANY OF THE ABOVE, STOP REEVALUATE</b>	
<input type="checkbox"/> Yes	Aircraft/Pilot approved for each special use mission and current?		
<input type="checkbox"/> Yes	Pilot and crew flight time/duty day requirements within limits?		
<input type="checkbox"/> Yes	Pilot briefed on mission and inherent hazards?		
<input type="checkbox"/> Yes	Performance Planning Complete?		

## APPENDIX D

## Safety Communiqué Form

OAS-34 / FS 5700-14

		<b>REPORTED BY: (optional)</b>	
		Name: E-Mail: Phone: Cell Phone: Pager: Organization: Organization Other: Date Submitted: mm/dd/yyyy	
<b>EVENT</b>			
Date: mm/dd/yyyy	Local Time: hhmm	Injuries: Y/N	Damage: Y/N
State:	Location: (Airport, City, Lat/Long or Fire Name)		
Operational Control:			
Agency:			
Region:			
Unit:			
<b>MISSION (* see look-up tables)</b>			
Type: *	Other:		
Procurement: *	Other:		
Persons Onboard:	Special Use: Y/N	Hazardous Materials: Y/N	
Departure Point:	Destination		
<b>AIRCRAFT (* see look-up tables)</b>			
Type: *	Tail #	Manufacturer: *	Model:
Owner/Operator:	Pilot:	Manager:	
<b>NARRATIVE: (A brief explanation of the event)</b>			
<b>CORRECTIVE ACTION: (What was done to correct the problem)</b>			

**APPENDIX E****Aviation Toolkit****PASP Templates**

[https://drive.google.com/a/doi.gov/folderview?id=0B\\_Mu-lco5V4ESF8xLWMwc3fUkk&usp=sharing](https://drive.google.com/a/doi.gov/folderview?id=0B_Mu-lco5V4ESF8xLWMwc3fUkk&usp=sharing)

**SAFECOM**

<https://www.safecom.gov/>

**Interagency Aviation Training Website**

[www.iat.gov](http://www.iat.gov)

**5 Steps to a Safe Flight Card**

<http://oas.doi.gov/safety/library/Guides/orangec.htm>

**12 Aviation Situations that shout “watch out”**

[http://www.wildfirelessons.net/documents/6MFS\\_AviationWatchoutSituations.pdf](http://www.wildfirelessons.net/documents/6MFS_AviationWatchoutSituations.pdf)

**ALSE handbook**

[https://www.iat.gov/docs/ALSE\\_2008.pdf](https://www.iat.gov/docs/ALSE_2008.pdf)

**DOI Policy Link**

<http://oas.doi.gov/library/index.htm>

**USFS Policy Link**

[http://www.fs.fed.us/fire/aviation/av\\_library/index.html](http://www.fs.fed.us/fire/aviation/av_library/index.html)

**Technical Assistance Directory**

<http://www.nwccg.gov/pms/pubs/pms504.pdf>

**Essex MT NTSB Link**

[http://www.nts.gov/aviationquery/brief2.aspx?ev\\_id=20040930X01543&ntsbno=SEA04GA192&akey=1](http://www.nts.gov/aviationquery/brief2.aspx?ev_id=20040930X01543&ntsbno=SEA04GA192&akey=1)



**DOI Cooperator Aircraft Policy**

<http://elips.doi.gov/ELIPS/DocView.aspx?id=1094>

**FAA Risk Management Handbook**

[http://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/media/FAA-H-8083-2.pdf](http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/FAA-H-8083-2.pdf)

**Mishap Response Plan**

[http://gacc.nifc.gov/egbc/dispatch/ut-nuc/aviation/docs/2012\\_Mishap\\_Response\\_GuideC%20docx.pdf](http://gacc.nifc.gov/egbc/dispatch/ut-nuc/aviation/docs/2012_Mishap_Response_GuideC%20docx.pdf)

**AOPA Preflight briefing video**

[http://www.aopa.org/aopalive/?watch=qyeWc0NjrbHv5xaAOSeq-W7t\\_phACQ9J#oid=qyeWc0NjrbHv5xaAOSeq-W7t\\_phACQ9J](http://www.aopa.org/aopalive/?watch=qyeWc0NjrbHv5xaAOSeq-W7t_phACQ9J#oid=qyeWc0NjrbHv5xaAOSeq-W7t_phACQ9J)

**Helicopter Safety Video**

<http://youtu.be/M4Z9mgwbZuY>

**Gar Model and Risk Matrix**

<http://www.nifc.gov/PUBLICATIONS/ihog/appendix/2009AppendixJ.pdf>

**Interagency Aviation User Pocket Guide**

[http://www.fs.fed.us/fire/aviation/av\\_library/IA%20User%20Pocket%20Guide%202008.pdf](http://www.fs.fed.us/fire/aviation/av_library/IA%20User%20Pocket%20Guide%202008.pdf)

